

Appendix 7. Bird Resources of the Missisquoi Watershed

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Missisquoi National Wildlife Refuge

The Missisquoi National Wildlife Refuge (MNWR) in Swanton is an Important Bird Area that provides critical habitat for a large number of Vermont Species of Greatest Conservation Need such as great blue heron, osprey, the state-threatened black tern, pied-billed grebe, and least bittern. The 6,729 acre refuge was established in 1943 to protect important stopover habitat for large flocks of migratory birds, particularly waterfowl. This area includes most of the Missisquoi River delta where it flows into Missisquoi Bay. The quiet waters and wetlands are fed by the waters of the Upper Missisquoi and Trout Rivers in the Study area, and attract large flocks of migratory birds. In addition, the refuge also hosts a large great blue heron rookery, the largest black tern population in Vermont, and nearly a third of the nesting ospreys in the state which was over 30 active nests in 2009 (GMAS website, 2012). Wood Ducks are also abundant in the refuge, and the grasslands on Tabor Road host the largest bobolink population in Vermont.

Recreational Birding

Like across much of the US, birding is an important and thriving industry in Vermont. A quick web search will give you information about birding organizations, books to buy, bird tours, places to bird watch, and a VT birding email list. Birders living in Vermont spend money on bird seed, birding paraphernalia, and travel, and out-of-state birders from around the globe make Vermont one of their birding vacation destinations. Trails, signs, boardwalks, viewing blinds, and platforms are all important parts of creating easy and meaningful access for recreational birders. The [Lake Champlain Birding Trail](#) unifies and connects 88 birding sites – including the Missisquoi National Wildlife Refuge (MNWR) - along the Lake Champlain shoreline and uplands in Vermont and New York into a cohesive and marketable unit. Though not directly within our Study area, the water quality of our area directly promotes quality bird habitat in the MNWR, and this trail (trail map and [brochure](#)) could bring visitors to the uplands in our area.

Significant Ecological Areas in the Study area important to birds:

McAllister Pond Marsh: Listed in the VT River Study as an important resource, this 20-acre pond and marsh habitat complex in Lowell supports many species of waterfowl as well as a trout fishery.

Jarvis Brook Heron Rookery: Multiple pairs of Great blue herons sometimes congregate at group nesting sites, called rookeries. There are 32 known Heron Rookeries in Vermont, and the largest one (~500 nests) is in Missisquoi Bay. The Jarvis Brook Heron Rookery is in the town of Enosburgh. From the town plan – “This is a partially wooded, deep marsh area which supports a great blue heron nesting colony on a half-mile stretch of an unnamed tributary of the Jarvis Brook.”

Critical Wildlife Habitats

Bicknell’s Thrush IBA Complex: The high-elevation forests and ridges of the Green Mountains in Jay State Forest are part of the statewide Bicknell’s Thrush IBA Complex. In Vermont, this rare species is at the southern extent of its range and only nests on the highest mountain tops. Threats to this species

include habitat degradation and fragmentation due to ski area, communications tower, and wind turbine development. Atmospheric pollution may be affecting forest health, and climate change could profoundly impact long-term viability of montane balsam fir forest habitats. Research and monitoring, such as that conducted through Mountain Bird Watch, are critical for understanding and responding to how this species reacts to ongoing threats.

Peregrine Falcon IBA Complex: The cliffs located in Hazen's Notch in Lowell are a known nesting site for peregrine falcons and are part of the Peregrine Falcon IBA Complex. This rare species was recommended for delisting from the state endangered species list in 2003 after the population began to rebound. Increased survival rates are attributed to banning of use of DDT and protection and monitoring of nests sites across the state conducted by the Vermont Peregrine Project. Human disturbance on or near nesting cliffs is the greatest known problem to peregrines nesting in Vermont. Continuing to monitor nest sites throughout the state and work with landowners and recreational user groups to reduce/minimize human disturbance at nesting cliffs through access closures during the breeding season are important strategies for protecting this species.

Forest Bird Habitat

Vermont's forests provide critical breeding habitat for a high diversity of forest birds that is significant at a continental and global scale. The Atlantic Northern Forest of Vermont, New Hampshire, Maine and New York provide breeding habitat for dozens of bird species like the Black-throated Blue Warbler, Canada Warbler, Wood Thrush and the Bicknell's Thrush. These species and dozens more have in some cases 90% of their global population breeding in this region. Although common in our region, many of these birds are seeing long-term declines that, like the proverbial "canary in the coal mine," may be indicating larger ecosystem problems.

The North American Bird Conservation Initiative (NABCI) defines birds like these as *responsibility birds*. A responsibility bird has a high proportion of its global population breeding in the region, and therefore species conservation efforts should be focused in this area. The concept is simple. Rather than wait for a bird species to become vulnerable and end up on a threatened or endangered species list, we can take action to conserve birds in the core of their population range. The advantage to this approach is that low-cost stewardship activities, education and monitoring can help maintain or increase the populations of these birds.

Audubon Vermont's Forest Bird Initiative is integrating science, education, public policy and forest management expertise to conserve forests within Vermont that are important to birds, by identifying, monitoring and stewarding a network of forest Important Bird Areas (IBA) that support a significant number of breeding forest birds to maintain viable global populations of responsibility bird species. None of these forest IBAs fall within the Study area (though Audubon Vermont is currently in the process of mapping continental and global forest IBAs in cooperation with other states along the Atlantic Flyway); however, there are large blocks of unfragmented forest present in the Study area, particularly around Jay Peak, that are high quality habitat for the full suite of forest responsibility birds. In addition to providing high-quality habitat for birds and other wildlife, extensive areas of upland forest play a critical role in protecting the water quality within the Upper Missisquoi and Trout River watersheds by minimizing soil erosion and landslides, stabilizing stream channels, absorbing and mitigating floodwaters, and filtering water.

Forested Bird Habitat - Threats:

- Loss and degradation of forest habitat caused by conversion from forestlands to other land uses

- Forest fragmentation (when there is no connectivity between habitats, the forested landscape can become unconnected, small pockets of forested land rather than continuous stretches)
- Global climate change (please see more information at the end of this appendix section)
- Lack of structurally diverse, high-quality forest habitat (meaning there is a lack of forest age class diversity, many ages of trees rather than a uniform age, across the landscape and lack of old, 100+ year old trees, in the forest)

Forested Bird Habitat – Opportunities for Action/Recommendations:

- ≈ Assist landowners and foresters with planning for forest management that enhances bird habitat for responsibility species (those species with a high proportion of its global population breeding in our region, discussed above, such as the veery, black-throated blue warbler, or wood thrush)
- ≈ Promote ways of generating income (such as maple syrup production) from forest parcels as an alternative to sale, development, or parcelization (cutting one large piece of land into small subsets)
- ≈ Work with interested towns and initiatives such as Staying Connected to protect large blocks of forest and key wildlife habitat in town plans and zoning bylaws

Riparian Bird Habitat

Riparian ecosystems along the streams and rivers in the Study area provide important habitat for a high diversity of birds. General river and stream riparian habitat types include: floodplain forests, forested swamps, shrub swamps, marshes, wet meadows, and shores. Additionally, the river itself provides important habitat for birds such as mergansers, solitary sandpipers, killdeer, kingfisher, herons, and more. The following table lists some bird species that are likely associated with these riparian ecosystems within the Study area:

Riparian Habitat Type (Links to Wetland, Woodland, Wildland text)	Associate Bird Species
Floodplain Forests	Veery+* Eastern wood pewee+ Blue-grey gnatcatcher Yellow-throated vireo
Forested Swamps	Veery+* Canada warbler+* Red-shouldered hawk* Wood duck White-throated sparrow+ Northern parula+
Shrub Swamps	Alder flycatcher+ American woodcock+* Veery+*
Marshes and Wet Meadows	American bittern* American black duck* Great blue heron* Blue-winged teal*
River Shores	Great blue heron*
Rocky-bottomed Forest Streams	Louisiana waterthrush+

+ = Audubon Vermont Forest Responsibility Species
* = Vermont Species of Greatest Conservation Need

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In addition to providing quality bird habitat, riparian (riverside) ecosystems also buffer aquatic plants and animals from disturbance; prevent wetland and water quality degradation; mitigate flooding; and provide organic matter, structure, and nutrients for aquatic systems.

Riparian Bird Habitat - Threats:

- Loss and degradation of forest habitat caused by conversion from forestlands to other land uses
- Riparian Buffer/Forest fragmentation (when there is no connectivity between habitats, the forested landscape can become unconnected, small pockets of forested land rather than continuous stretches)
- Non-native invasive species (see the water quality chapter for a greater discussion on invasive species)
- Alteration within the river including dredging, armoring or straightening, or changes to water flow
- Pollution input to the rivers from runoff from the land or carried in by the tributaries
- Incompatible recreation including intense use of river shores which could cause degradation of water quality, important habitat and food sources and trampling near nests

Riparian Bird Habitat - Opportunities for Action/Recommendations:

- ≈ Many initiatives to maintain good water quality in the Missisquoi and Trout Rivers would also support preservation of critical wildlife habitat including surveys of and protection of riparian (riverside) habitats
- ≈ Provide technical assistance and support to private landowners, towns and regional planning commissions to maintain and enhance riparian habitats, and reduce invasive species abundance
- ≈ Identify those areas with greatest conservation potential, and work with willing landowners to protect those with the greatest number of Species of Greatest Conservation Need ([SGCN](#)) such as osprey, peregrine falcon, or great blue heron or rare, threatened or endangered species
- ≈ Help to avoid placing access areas located in ecologically sensitive sites, and help manage those that are already established
- ≈ Promote education and use of forest management practices in floodplains and forested swamps that protect the ecological integrity of these sensitive ecosystems

Grassland Bird Habitat

Hayfields, meadows, and hedgerows associated with agricultural use along the river valleys in the Study area are able to provide quality nesting habitat for several birds of Greatest Conservation Need ([SGCN](#)) in Vermont. Bobolinks utilize large (5+ acre) expanses of grassland or fallow hay fields with little or no alfalfa, high litter cover and scattered broad-leaved forbs for nest-site cover ([Vermont's Wildlife Action Plan](#), 2005). Northern Harrier habitat includes marshy meadows, wet, lightly grazed pastures, old fields, mesic grasslands, and drained marshlands. Upland Sandpipers prefer large grassland areas (20-40 ha) with a mosaic of grassland types as areas of short grass are used for feeding while areas of taller grass (10-30 cm) are used for nesting. American Kestrels nest in cavities or nest boxes in most open areas. Other grassland birds of high conservation need include Eastern meadowlark and field sparrow. These aforementioned species, bobolink, harrier and upland sandpiper, benefit from grasslands that are not subjected to early (before July 15) mowing.

Grassland Bird Habitat - Threats:

- Habitat degradation caused by early hay harvests and heavy grazing rotations
- Loss and degradation of forest habitat caused by conversion from forestlands to other land uses
- Forest fragmentation (when there is no connectivity between habitats, the forested landscape can

- become unconnected, small pockets of forested land rather than continuous stretches)
- Loss of field habitat due to field abandonment and ensuing natural succession back to forest

Grassland Bird Habitat - Opportunities for Action/Recommendations:

- ≈ Encourage managing grasslands using the [USDA/NRCS pamphlet](#) which promotes delaying mowing until after breeding (August 15 if possible or at least until after July 15)
- ≈ [Vermont Fish and Wildlife](#) recommends including language in your town plan which states “Where appropriate, encourage management of existing grasslands larger than five acres, including artificial habitats, in a manner compatible with successful grassland bird nesting. Identify and maintain or increase populations of rare grassland birds in the town.”
- ≈ Develop education and outreach program to provide information about grassland/hedgerow dependent species and management options to enhance their populations in Vermont, including cost-share programs, such as NRCS, and support the excellent management already in progress in our Study area

Climate Change: Impacts on Vermont Birds and Forests

Taken from: [Managing Your Woods with Birds in Mind](#): A Vermont Landowner’s Guide. Put out by Audubon Vermont and the Vermont Department of Forests, Parks, and Recreation. 2012.

Global climate change is having regional impacts on Vermont forests and birds. Though implications for individual species can appear benign, potential disruptions of complex ecosystem connections and process are far-reaching and serious for forests, birds, other wildlife, and people. Forest landowners should keep the following trends in mind as they plan for the future of their forests:

<i>Climate changes in Vermont</i>	<i>Impacts on Birds</i>	<i>Impacts on Forests</i>
<p>Longer growing seasons.</p> <p>More frequent winter thaws and earlier springs.</p> <p>Less winter precipitation falling as snow and more as rain.</p> <p>Increased heavy downpours.</p> <p>Earlier spring snowmelt resulting in earlier peak river flows.</p> <p>More frequent short-term droughts in late summer and fall.</p> <p>More frequent hot (over 90° F), humid days.</p>	<p>Shifts in bird ranges. Nearly 60% of bird species that winter in North America have moved their ranges northward or inland over the past 40 years with shifts that can exceed hundreds of miles.</p> <p>Changes in the timing of bird migration and life cycle events. Many birds are arriving on their breeding grounds and are laying their eggs earlier. Birds that arrive too early are at risk for exposure to late spring storms.</p> <p>Bird stress and mortality are anticipated to increase in association with increased exposure to extreme weather events, more frequent mismatches in time and space between birds and their food, exposure to new pests and pathogens, and lack of suitable habitat in new ranges.</p>	<p>Changes in forest types and plant species distribution. Spruce-fir forests are being replaced by hardwoods at high elevations. At lower elevations, oak-pine forests will likely replace forests dominated by sugar maple and other northern hardwoods.</p> <p>Increased spread of forest pests, such as hemlock wooly adelgid, that can survive milder winters and take advantage of stressed trees. Non-native, invasive plants may also spread.</p> <p>Forest-based economy will be impacted by changes in timing and extent of peak fall foliage, shortened winter logging season, stresses on maples in sugarbushes, and reduced snow fall for winter recreation.</p>

What you can do

- ≈ Increase the chances that your forest and its inhabitants can successfully adapt to climate change by creating a diverse forest that includes a variety of species, stand structures, and age classes.
- ≈ Maximize the resiliency of your forest to climate change by reducing other stresses on your forest through invasive plant management, reducing frequency of harvests, and other strategies.
- ≈ Help scientists learn more about how birds are responding to climate change by entering when and where you observe birds – whether in the woods or your backyard – into the online citizen science database eBird: www.ebird.org Add to 10 years' worth of contributions from amateur birdwatchers – more than 28 million observations!

Additional Resources

- Northeast Kingdom Audubon Society: www.nekaudubon.org
- Green Mountain Audubon Society: www.greenmountainaudubon.org
- Missisquoi National Wildlife Refuge: www.fws.gov/northeast/missisquoi
- Lake Chaplain Birding Trail: http://www.champlainvalleynhp.org/lc_birding_trail/index.html
- Vermont Breeding Bird Atlas: <http://www.vtecostudies.org/vbba/>
- Vermont Bird Listserv: <http://birdingonthe.net/maillinglists/VTBD.html>
- All About Birds – online bird guide: www.allaboutbirds.org
- North American Bird Conservation Initiative: <http://www.nabci-us.org/>
- eBird – online citizen science database: www.ebird.org
- Vermont Center for Ecostudies: <http://vtecostudies.org/>
- Mountain Bird Watch: <http://www.vtecostudies.org/MBW/>
- Vermont Fish and Wildlife Department: www.vtfishandwildlife.com
- Vermont Wildlife Action Plan: http://www.vtfishandwildlife.com/swg_cwcs_report.cfm
- Vermont Invasives: www.vtinvasives.org
- Vermont Department of Forests, Parks, and Recreation: www.vtfpr.org
- Vermont Natural Resources Conservation Service (NRCS) – EQIP and WHIP financial incentives and cost-share programs: www.vt.nrcs.usda.gov
- Vermont Coverts: www.vtcoverts.org
- Vermont Woodlands Association – includes association of consulting foresters: www.vermontwoodlands.org

Books and Publications

Audubon Vermont:

- *Managing Your Woods with Birds in Mind: A Vermont Landowner's Guide.* Audubon Vermont and the Vermont Department of Forests, Parks, and Recreation. 2012. PDF available at: http://vt.audubon.org/sites/default/files/documents/landowner_packet_5-2012_small.pdf
- *Foresters for the Birds Toolkit.* Audubon Vermont and the Vermont Department of Forests, Parks, and Recreation. 2012. PDF available at: <http://vt.audubon.org/foresters-birds>

Others:

- *The Northern Forest* by David Dobbs and Richard Ober, 1996.
- *Northern Woodlands Magazine.* <http://northernwoodlands.org>
- *The Tree Identification Book* by George W.D. Symonds, 1958.
- *The Sibley Field Guide to Birds of Eastern North America* by David Allen Sibley, 2003.
- *Sibley's Birding Basics* by David Allen Sibley, 2002.
- *New England Wildlife: Habitat History, and Distribution* by Richard M. DeGraaf and Mariko Yamasaki.
- *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* by Elizabeth Thompson & Eric Sorenson, 2000.
- *The Nature of Vermont; Introduction and Guide to a New England Environment* by Charles W. Johnson, 1980.
- *More Than a Woodlot: Getting the Most from Your Family Forest* by Stephen Long, 2012. Published by Northern Woodlands.
- *Working with Your Woodland: A Landowner's Guide* by Mollie Beattie, Charles Thompson, and Lynn Levine, 1993, revised ed.
- *Landowner's Guide to Wildlife Habitat: Forest Management for the New England Region* by Richard M. DeGraaf, Mariko Yamasaki, William B. Leak, and Anna M. Lester, 2005.
- *The Audubon Society Guide to Attracting Birds: Creating Natural Habitats for Properties Large & Small* by Stephen Kress, 2006.
- *Trees, Shrubs, & Vines for Attracting Birds* by Richard M. DeGraaf, 2002.